Excel VBA Course Exercises

"For use in Classroom"

Electronic version to be sent to students

Before starting to use the exercises we need to configure excel for use, by default Excel does not show the developer tab, to turn it on go to the file menu, select options, then select customize Ribbon, place a tick in the developers tab.

On the developers tab make sure that use relative cell references is highlighted, on the developer tab click on the macro security button. For the purpose of the course we shall take security off.

Terminology used in recording macros

Macro Name

- The recorded name for the macro, cannot start with numbers and have no spaces.

Save a macro as Type

- **Personal Work Book** Stores a local copy of the macro at application level allowing it to be used with all open work Books
- **New Work Book** creates a new workbook and captures whatever you've done in the workbook in which you started recording. The resulting code is stored in a module in the "New" workbook.
  Could be used in a testing type environment, where you don't necessarily want to clutter up existing projects.
- **This Work Book** as the name suggests the macro is saved in the work Book you have open the macro can be only used in other workbooks if the work Book it was created in is open.
- **Description** This description is places inside the macro as a comment, these are inside a single quote at the beginning of the text and are coloured green, comments are used to aid the developer to identify the code they are using

Save macros to This Work Book Option

Exercise 1 5 mins

- Type your name into cell **A1**drag down to **A10** then across to column **H10**
- Select cell **D4**
- From the status bar Select **record** macro
- Define the name as **Headings**
- Create keyboard shortcut **CTRL+H**
- **Save** in this workbook
- Click **Ok** to continue
- Change the font colour to **Green**
- Click **Stop** recording on the status bar.
- Press **CTRL+Z** to undo changes.
- If the developer tab is not displayed do so now.
- Select Macros from the developer Tab or ALT+F8 to launch the macros dialog box.
- Select cell E6 press keystroke CTRL+H to run the macro.
- Repeat the above steps on cells G1 and G9

Save macros to This Work Book Option

Exercise 2 5 mins

- Select Cell **D1**
- From the status bar select **record** macro
- Define the name as **Bestfit (no space)**
- Create keyboard shortcut **CTRL+B**
- **Save** in this workbook
- Click **Ok** to continue
- From the home tab on the ribbon on the right side select format, AutoFit column width
- Click **Stop** recording on the status bar.
- Select cell F3 press CTRL+B to run the best fit macro, try on two other cells only (do not format the entire workbook at this point.)

Save macros to This Work Book Option

Exercise 3 **5 mins**

- Select Cell **B1**
- From the status bar select **record** macro
- Define the name as **Patterns**
- Create keyboard shortcut **CTRL+P**
- **Save** in this workbook
- Click **Ok** to continue
- Change the cell colour to **Yellow**
- Click **Stop** recording on the status bar.
- Select cell C1 press CTRL+P to run the Patterns macro, try on two other cells only (do not format the entire workbook at this point.)

Save macros to This Work Book Option

Exercise 4 **2 mins**

- Select Cell **E10** use the shortcut keys to format the cell

Please note the recordings that you have made so far have been relative recordings, macros that apply the recorded formats to cells that you select relative to the cursor position. Care has to be taken when recording relative macros because you can cause an error by trying to access areas outside the work sheet, the next example is set up to do that deliberately.

Save macros to This Work Book Option

Exercise 5 **8 mins**

- Select Cell **H1**
- Switch to the developer tab make sure **relative cells** is highlighted before we proceed.
- Click record macro
- Define the name as **Error**
- Create keyboard shortcut **CTRL+E**
- **Save** in this workbook
- Click **Ok** to continue
- Change the cell colour to **green**
- Select Cell **E1**
- Change the cell colour to **Red**
- Click **Stop** recording on the status bar.

- Select Cell **D1** Run the macro
- The macro changes the colour of both cells
- Select Cell **C1** Run the macro
- A Run time dialog Box opens giving you an error

Note run time errors are not that informative searching the web for error 1004 will bring back many answers if you are lucky you may find an answer for this example we shall click on debug.

- Click on the debug button on the error dialog Box
- The VBA Editor Window opens Highlighted in yellow is the problem area in this case we can see that the offset command has a negative number that will take us outside the spreadsheet. So we can modify the negative number to a positive number.
- Click the reset button in the VBA tool bar and close the VBA editor we shall look in more detail later.
- Now run the macro again this time the colour cell is to the right.

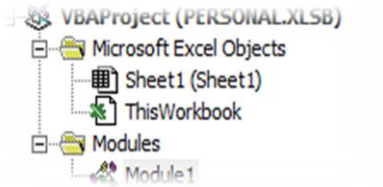
In the next exercise we shall save a macro to your personal macro work book and explore where it is stored as to edit or modify.

Exercise 6 **10 mins**

- Select Sheet 2
- Type your name into cell **A1**drag down to **A10** then across to column **H10**
- Select Cell **E5**
- From the status bar select **record** macro
- Define the name as **shadings**
- Create a shortcut **Ctrl + S** save into personal workbook
- Click ok to continue
- Change the cell colour to Blue
- Click **Stop** recording on the status bar.

Note you will have to display hidden folders to locate the folder through windows explorer this is for win 7 office 2010.
C:\Users\mouse\AppData\Roaming\Microsoft\Excel\XLSTART

- From various worksheets you can access the personal macro, close excel then launch again the personal macro is available
- From the VBA Editor locate the personal macro workbook



- Delete module 1
- Try The macro Again it should have disappeared

So far you have run macros from shortcuts and the macro dialog box, next we shall set up an icon in the Ribbon, UAT and add a button to the excel Worksheet

Exercise 7 **5 mins**

Add a macro shortcut to the UAT(user access toolbar)

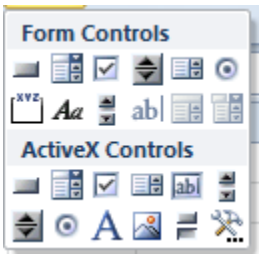
- From the end of the UAT click the down arrow
- Click on more commands
- From choose commands select macros
- Select the appropriate macro
- Click Add
- From the macro on the right select it, select modify
- Choose the relevant Icon
- Click on ok
- Click on Ok
- The new icon appears on the UAT
- Click the icon to run the macro.

Exercise 8 **5 mins**

Add a macro shortcut to the Ribbon Bar

- Select the file menu.
- Chose options.
- Select customise ribbon.
- From choose commands select macros.
- From the list select the required macro.
- On the right select a tab to add your macro.
- Click Create a new group.
- Click rename, rename to my macro.
- With the macro and the group highlighted select add.
- With the macro highlighted rename it first macro and select an icon you would like to use.
- Click ok, then click ok again.
- The icon is now on the ribbon.
- Click to try out.

Exercise 9A



Add a button to the spread sheet Form Controls

Form Controls

- On the developer tab from the controls group select **Insert**
- Select first icon from form controls **Button** (form Control)
- The cursor changes to a cross hair, click with the left button on the mouse to draw a rectangular button.
- On release of the mouse you now select a macro from the assign macro box highlight the required macro and click OK.
- You can now edit the text on the button click away when completed.
- Click the button to run the macro.
- To Re Edit text right click on the button select edit text
- Click away from the button to complete the task.

Exercise 9B

Add a button to the spread sheet Active X Controls

Active X Controls

- On the developer tab from the controls group select **Insert**
- Select first icon from Active X controls **Button** (Command Button) 2nd group
- The cursor changes to a cross hair, click with the left button on the mouse to draw a rectangular button.
- This places a command button on the page and places excel in a state of design mode.

- Double click the button to launch the VBA window the code below is displayed.

```
Private Sub CommandButton1_Click()

End Sub
```

- Modify the code adding the Call Function as shown below whee as macroxyz represents the name of the macro you want to run.

```
Private Sub CommandButton1_Click()

    Call macroxyz

End Sub
```

- Close The VBA Window

- Open the **properties** window for the button from either the **ribbon bar** on from **right clicking** on the mouse.
- In the properties dialog box navigate to caption, type in **My first X Control.**
- **Close** the properties box
- **Click the design view** button to enter real time you can now click on your button to run the macro**.**

Exercise 10

Delegate exercise

- Close and open Excel
- Enter random numbers from A1 to H9
- Record a macro to format numbers as currency
- Record a macro to change cell colour to blue
- Record a macro to change Text colour to white
- Assign the three macros to the toolbars UAT and Ribbon
- Create a new macro using a command button Use the call button to run the macros
- Create a new form button and assign macros
- Create a macro in your personal work book to format dates in the dddd dd mmmm yyyy format. Assign to your toolbar
- Use logic to see if you can assign all three macros to the command button.

At the end of this section you can now record a macro in both absolute and relative Mode, Know the difference between personal workbooks and macros stored in work Books. launch macros from either the dialog box, short cut key, toolbar, Form button or active X button and have had exposure to the VBA window we can see that recorded macros are powerful but are limited in their use relying on user activation. Using VBA we can introduce data validation, actions on events and automaton.

What is VBA?

In short Microsoft Programming language to control actions of a Microsoft product, whilst All VBA has some basic fundamentals it differs for each Product . VBA is a subset of VB, IN VBA all the hard work is done we manipulate what is available to us in VB you start from scratch.

VBA Terminology

Procedures

- A procedure is a statement of computer instructions

Object

- In VBA an object could be a Worksheet, a Cell, arrange of cells, a command button, a text Box, and so on

Property

- Each object in VBA has its own properties that control its appearance typical properties – column width, row height, font, text, value, formula, borders

Method

- If an object has an action, A **Command Button** has **on_click** this is referred to as a **method**

Comment

- A Line of text in a procedure that can be used to describe what is occurring, no code that executes

Module

- Is a file where you write your procedures

Execute

- In programing we say execute this means run/play

Collections

- Collections are a set of related objects having the same properties

Containers

- Containers are used to store and manipulate collections of data objects.

More about all of the terminology used as we progress through the course.

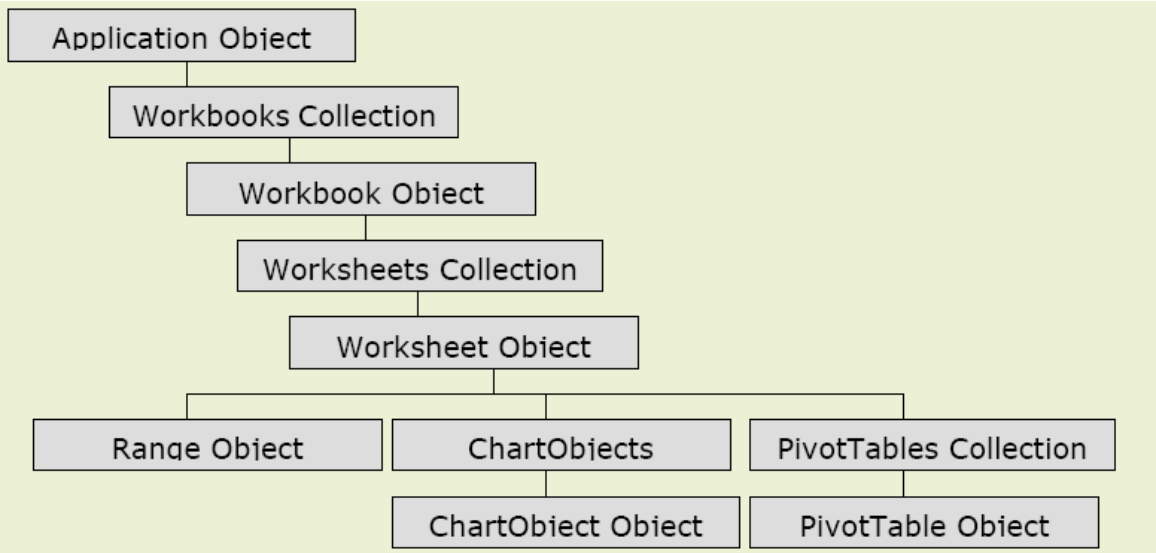
The Excel Object Model

The full Excel Object Model has over 200 objects and is too detailed to show on one

page. However you tend to only use certain objects on a regular basis and the following

diagram shows the relationship between the most commonly used objects.

Search for "Microsoft Excel Objects" in VBA Help to see the full diagram.



Object references: Cells, Sheets and Workbooks

The macro recorder will show you what your object references are but it will not show

you the variety of different expressions that can be used to access common Excel

objects.

Non-specific Object References	
Selection	The current selection
ActiveCell	The current active cell
ActiveSheet	The current worksheet
ActiveWorkbook	The current workbook
ThisWorkbook	Workbook containing the procedure
Specific Object References, various styles	

Range("A1")	Cell A1
Range("A1:F50")	Range A1:F50
[A1]	Cell A1
[A1:F50]	Range A1:F50
ActiveCell.Range("A2")	The cell below the active cell
Cells(1)	Cell A1
Range(Cells(1,1),Cells(50,6))	Range A1:F50
Range("NamedRange").Cells(1,1)	The first cell in the named range
Range("A:A")	Column A
[A:A]	Column A
Columns(1)	Column A
Range("5:5")	Row 5
[5:5]	Row 5
Rows(5)	Row 5
Sheets("Sheet1")	The Sheet called Sheet1
Worksheets("Sheet1")	The Worksheet called Sheet1
Sheets(2)	The second Sheet in the Workbook
Worksheets(3)	The third Worksheet in the Workbook
Worksheets("Sheet1").Range("A1")	Cell A1 on Sheet1
[Sheet1].[A1]	Cell A1 on Sheet1
ActiveSheet.Next	The sheet after the active sheet
Workbooks("Basic")	The Workbook file, Basic.xls

Square brackets

The full object reference to the worksheet cell A1 is Range("A1"). If you are typing-in cell

references rather than recording, it is easier to use the shortcut notation using square

brackets, [A1]. You can use the same style of referencing on other objects as well, such

as worksheets but there are a number of rules and restrictions.

It is usually best to restrict the square bracket notation to cell references only, where it is entirely definitive and reliable.

With…End With

The With statement is used so the object reference can be made and then retained so that multiple actions may be carried out without having to repeat the same object reference in each statement.

You can keep the With reference open for as long as you like in the same procedure, just pointing to it using the dot operator. Every With requires an End With. You can have

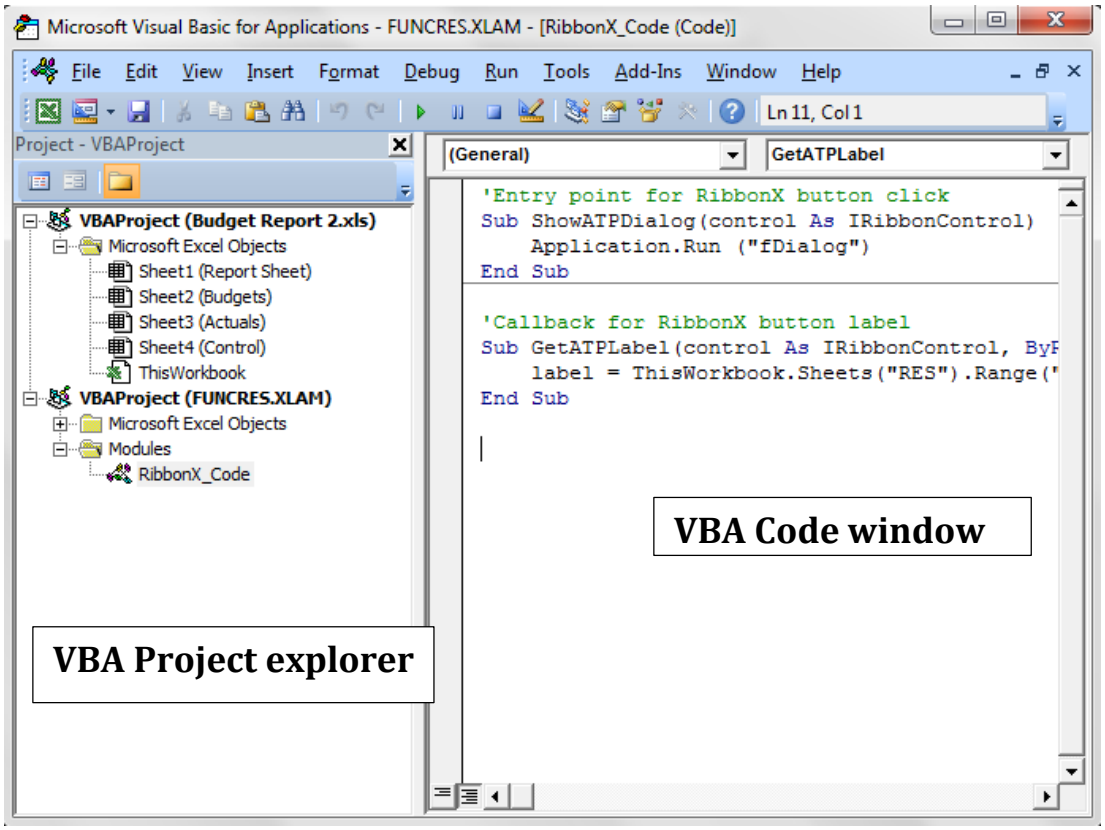
multiple With pointers. When you are reading code that uses multiple With pointers, the rule is simple; the dot points to the nearest With.

```
With Object
.Property
With .Child Object
.Method
.Method
End With
End With
```

Exercise 11

Explore The VBA Editor

- Open the file Budget Report Access the Excel VBA window by clicking ALT + F11



- **Project Explorer**

VBA Navigation window displays a project for each work book or template that is open, note that the excel objects(worksheets are referenced in two ways, the tab name and a constant sheet name.)

- **VBA Code Window**

As it suggests the place you type your code on an open module

- **Properties window**

  Lists all the properties of the selected object

- **Immediate Window**

The immediate window is Most useful for executing VBA statements directly, testing statements and helping to debug your code The two main functions are to and to Send output to be viewed during execution Execute commands immediately. Let's you run any VBA statement, manually while a program is running. This is extremely powerful as it allows you to test and execute small parts of code. has the shortcut key (Ctrl + G).

There are two ways to print to the immediate window, either by including Debug.Print statements in the actual code or by entering print statements directly.

A. *Debug.Print Range("A1").Value*
B. *? Range("A1").Value*

- **Locals Window**

Lists the values of all the variables currently in scope.

- **Watch Window**

A watch is a variable or expression that has been placed in the window to enable you to monitor its value. Let's you watch the values of variables and expressions as your code executes.

Exercise 12

properties window

- In the project sheet explorer verify that (sheet 1) is selected
- In the properties window double click **Name** Not! **(Name)**
- **Edit** the value to read **purchase sales 2012**
- Press the **enter** button
- Double click **standardwidth**
- Enter a value of 12

Now for a little Fun

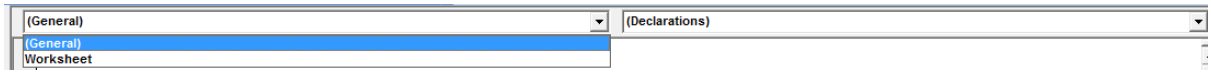
- **In the scroll area type the following values and then switch windows to see the effect**
- **$A$1**
- **$E$16**
- **$A$1:$E$16**

Exercise 13

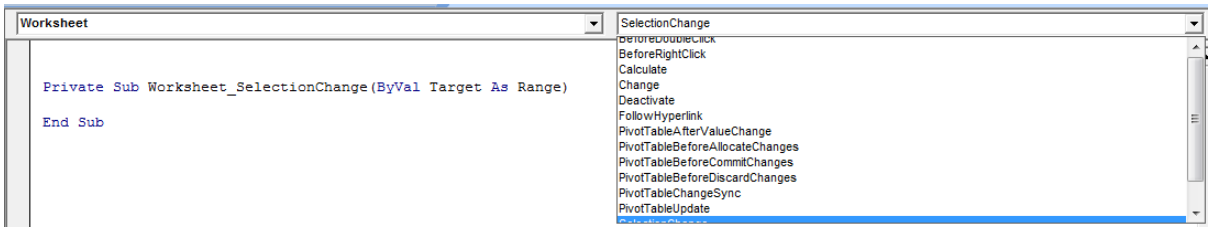
Code window, object list and procedure list

General

Object List **Procedure List**



WorkSheet



- **Select worksheet 2 in the VBA explorer**
- From the **object list** select **worksheet**
- From the **procedure list** select **activate**
- **Type in the following code as to display as below**

- **MsgBox "your on page 2", vbInformation, "PAGE INDICATOR"**

Private Sub Worksheet_Activate()

MsgBox "your on page 2", vbInformation, "PAGE INDICATOR"

End Sub

- Close the VBA Editor each time you switch to worksheet 2

  A message box should appear displaying your on page 2

Exercise 14

Identify the colours in the code Window

- Blue – indicates keywords that are reserved by VBA
- Black Indicates Normal VBA Code Text
- Red – indicates Errors in the code or procedure
- Green Indicates a Comment
- Type in the following text

```
Sub showingcolours()

   ' this text will display the colours used

  MsgBox "rot"
  Call macro3

End Sub
```

Exercise 15

Using Methods

Every object can perform certain actions are defined by methods. Some methods need a value as input to complete their actions. For example, the open method of the workbook object takes a file name as input so it knows specifically what workbook to open. The input value is called an argument. An argument is a variable, constant or expression that provides additional information to a method, so that it can execute properly. To use a method in VBA code, you would use the following syntax.

Object.method argument1, argument2, argument3Select Cell
For example Sheet1.protect “mypassword”

- Add password Protection to sheet 2 in a Workbook

```
Sub password_on( )
        Sheet2.protect “password”
End Sub
```

- Remove password Protection to sheet 2 in a Workbook (A)

```
Sub password_off( )
        Sheet2.unprotect “password”
End sub
```

- Remove password Protection to sheet 2 in a Workbook (B)

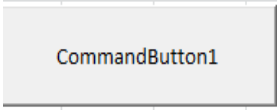
```
Sub password_off( )
        Sheet2.unprotect
End sub
```

Note if you use option B you are prompted for your password in the form of a dialogue box

Exercise 16

Responding to an Event

- On the developer tab from the controls group select **Insert**
- Select first icon from Active X controls **Button** (Command Button) 2nd group
- The cursor changes to a cross hair, click with the left button on the mouse to draw a rectangular button.
- This places a command button on the page and places excel in a state of design mode.



- Double click the button to launch the VBA window the code below is displayed.

```
Private Sub CommandButton1_Click()
        Sheet2.Unprotect2
End Sub
```

- In the properties sheet for the button under name type "unprotect Sheet"
- In the code window select worksheet 2
- From the object list select worksheet
- From the procedure list select activate
- Type in the following code

```
Private Sub Worksheet_Activate()
    Sheet2.Protect "password"
End Sub
```

Each time you select sheet 2 the worksheet is locked click the button unprotect and enter the password "password" to unlock.

Exercise 17

Add a message box to the code

- Add password Protection to sheet 3 in a Workbook with a message Box

```
Sub password_on( )
        Sheet3.protect “password”
        Msgbox “Protected worksheet. You cannot edit data in this list
End Sub
```

Exercise 18

Delegate Exercise

- Try the code below assigned to a command button

```
Private Sub CommandButton2_Click()
        Sheet3.protect
        MsgBox "worksheet locked", vbInformation, "File Locked"
End Sub
```

Exercise 19

Use row and column references

```
Sub Calculate()
ActiveCell.FormulaR1C1 = "=Product(rc[-2]:rc[-1])"
End Sub
```

Replace ActiveCell.FormulaR1C1 = "=Product(rc[-2]:rc[-1])"

With

ActiveCell.FormulaR1C1 = "=sum(rc[-2]:rc[-1])"

Try

ActiveCell = "=sum(a1:a5)"

Exercise 20

Explore the object browser

- Switch to VBA Editor ALT+F11
- From the view menu select object browser or press F2

The Object Browser enables you to see a list of all the different objects with their methods, properties, events and constants.

The default libraries available:

Excel – A collection of classes available in Excel i.e. workbook, worksheet, range, chart, etc…

Office – A collection of classes generic to all office applications i.e. command bar, command icon, help assistance, etc…

stdole – A collection of standard OLE classes which allow other OLE applications to share information (Not covered in this manual).

VBA – A collection of classes which allow generic functions to be used i.e. MsgBox, InputBox, conversion functions, string functions, etc…

VBAProject – A collection of classes local to the active workbook project, which includes sheets, workbook and any user, defined classes

- From classes select Global
- In the list of members press **R** to go to start of R in list select range, the box at the bottom displays information about the range property.

- Right click on range and copy
- Open the immediate window and paste range into this window
- Type each of the lines of code below one at a time then press enter, remember to switch to excel to see the effect the code is making.
- Range("b2:b4").Select
- Range ("a1,b2,c3,d4,e5").Select
- Range("A1:A5,B4,d7:d11").Select

It may be easier to have the VBA window and Excel window displayed side by side to see the actions happen in real Time

Programming Basics

Data

Programs receive data as input then process the data as output, a good example is a calculator where you input numbers and instruct it which operator to use, when inputting data the program uses a temporary storage area called a variable, variables can be defined as different types a full listing on page 14 of the user manual.

Exercise 21

Implicit Variables (not declared prone to errors)

- Close excel and Restart the application
- Switch to the VBA editor ALT+F11
- Select VBA Project workbook 1, Insert Module
- Make sure Module 1 is selected Check the title bar
- Type the following code

```
Sub calc ( )

    Answer = 100 + 100

    Msgbox(anser)

End Sub
```

- Run the code press the play button or press F5
- A message box opens displaying nothing, the reason the variable names differ causing the problem. Click **OK** to return to the VBA screen.

- Let's try that again making sure that the variable is the same in both places.

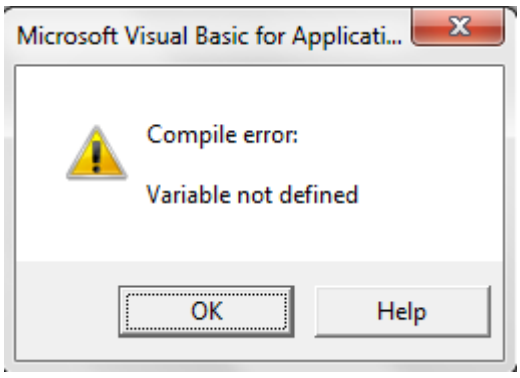
```
Sub calc ( )

    Answer = 100 + 100

    Msgbox(Answer)

End Sub
```

- As you can see this time we come back with the correct result but as we have discovered it is prone to mistakes let's try something different type in the following code

Variable option explicit (the name for the variable has to be declared)

```
Option Explicit

Sub calc()

  Answer = 100 + 100

  MsgBox (Anser)

End Sub
```

- Run the code press the play button or press F5 this time the message box below displays showing the variable name has not been declared we need to add the following line of code.
- "Dim answer As Byte"




```
Sub calc()
        Dim answer As Byte
        answer = 100 + 100
         MsgBox (answer)
End Sub
```

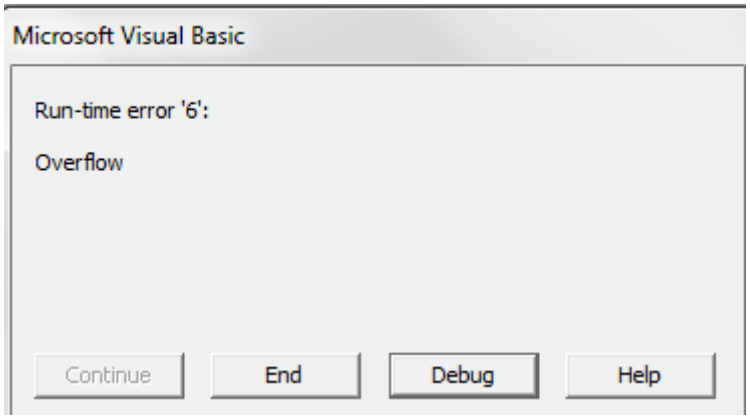
- Run the code again and the code runs fine

Change one value in the argument to 200

Option Explicit

```
Sub calc()
Dim answer As Byte
        answer = 100 + 200
         MsgBox (answer)
End Sub
```

- Run the code again, this time you will get an overflow error



- Change the data type to remedy this problem, try integer -32,768 to 32,767 Integer stores whole numbers only.

Option Explicit

```
Sub calc()

Dim answer As integer

        answer = 100 + 200
         MsgBox (answer)

End Sub
```

Exercise 22

Variable Constant (a variable that doesn't change)

- In the code window type the following

```
Option Explicit
Const vat = 0.20
Sub calc()
Dim answer As Integer
    answer = (100 + 100) * vat
    MsgBox (answer)
End Sub
```

Replace MsgBox (answer) with MsgBox "£ " & (answer)

- Let's make some more changes to the code
- Change the vat rate to the following

```
Option Explicit
Const vat = 0.21
Sub calc()

Dim answer As Integer
answer = (100 + 120) * vat
MsgBox "£ " & (answer)

End Sub
```

- The answer is returned as a whole number rounded down, let's make one more change, change the data type to currency

```
Option Explicit
Const vat = 0.21

Sub calc()
Dim answer As Currency
answer = (100 + 120) * vat
MsgBox "£ " & (answer)
End Sub
```

Exercise 23

understanding Expressions and operators

Expressions

An expression is a combination of operators, constants, procedures and names of controls and properties that is evaluated to obtain a result. When you use an expression in code it returns a value in one of the data types provided by VBA.

Operators

Operators are arithmetic symbols

Arithmetic Operators		**Comparison Operators**	
+	Addition	<	Less than
-	Subtraction	>	Great than
/	Division	=	Equal to
*	Multiplication	<>	Not equal to
A comparison operator returns a Boolean value because the result of any comparison is always true or false			

Exercise 24

The cells object

The cell object syntax **cells (row, column)** operates similar to the index function the main difference between the cell object function is unlike the excel functions that call column first then row, the cell object calls the row first then the column.

Push or Pull

- In the code window type the following code this will populate the cell D2 with 2012

```
Sub push()
    Cells(2, 4).Value = 2012
End Sub
```

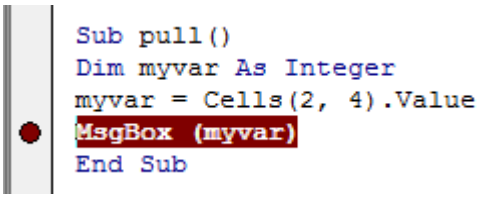
- In the code window type the following code this will retrieve information from cell D2

```
Sub pull()
Dim myvar As Integer
myvar = Cells(2, 4).Value
End Sub
```

- Now we have run the code we can't see straight away that the value has been place we shall use two methods to extract that data one is to use the locals window and set toggle points on the code and the other is to modify the code to output the data to a message box.
- Modify the code as below to output results to a message box.

```
Sub pull()
    Dim myvar As Integer
    myvar = Cells(2, 4).Value
    MsgBox (myvar)
End Sub
```

- To output to the locals windows we need to set toggle points or use the step into procedure.
- Click into the code sub pull
- Click the view menu and click Locals window
- Press the **F8** key repeatedly to scroll through the code observe the locals window you will see that the value 2012 will appear
- In the image below we have set a break point a place in where the code will stop running when you click play or F5, to set the break point click in the grey column next to the line of text you require the break. In the example shown the value is displayed in the locals window before the message box launches, press F5 again to continue running the code.



Message Boxes and Input Boxes

Message boxes output data, input boxes trap Data

Exercise 25

☞ In the code window type the following

```
Sub inbox()

'sets the variable to hold the data
   Dim employee As String

      'opens a input box and passes to variable
      employee = InputBox("Enter Name")

      'takes the information from the variable and passes to cell D2
   Cells(2, 4).Value = employee

   'opens a message box and joins text to a variable then joins  to text and
displays an information button
   MsgBox "you have placed the text " & (employee) & " in cell D2",
vbInformation

End Sub
```

As you can see you are building up your use of knowledge and little by little building on what you learn at each stage.

User Defined Functions Delegate Exercise

Exercise 26

- Create the following example you are going to collect the following information
-
- Name
- Surname
- Job
- Salary
- Date of birth
- Calculate age

- place each answer trapped onto the spreadsheet starting at cell A2 across to E2, in cell F2 you will calculate the age.

- Display a message to show

- your name is " first name and surname

- "you have applied for job of " XYZ " and require a salary of " £ XYZ

- "your current age is " XYZ

- "thank you for your time we will contact you shortly"

- After you complete the information your screen should look like below

	A	B	C	D	E	F
1	First Name	Surname	Job role	Wage	DOB	Age
2	mike	barrett	train driver	£35,000.00	01/10/1961	50.94

By the end of the course you would have learnt how to go to the next available blank row and use a form rather than input boxes to enter the data.

Exercise 26 Answer

```
Sub job()
Dim name As String
Dim surname As String
Dim job As String
Dim salary As Currency
Dim birth As Date
Dim age As Double


curdate = Date
name = InputBox("enter your first name")
surname = InputBox("enter your Surname name")
job = InputBox("enter your required Job")
salary = InputBox("enter required salary")
birth = InputBox("enter date of birth dd/mm/yy")
Cells(2, 1).Value = name
Cells(2, 2).Value = surname
Cells(2, 3).Value = job
Cells(2, 4).Value = salary
Cells(2, 5).Value = birth

age = Int(((curdate) - (birth)) / 365.25)

Cells(2, 6).Value = age
MsgBox "your name is " & (name) & " " & (surname)
MsgBox "you have applied for job of " & (job) & " and require a salary of " &
"£" & (salary)
MsgBox "your current age is " & (age)
MsgBox "thank you for your time we will contact you shortly"
End Sub
```

Exercise 27

Concatenating text (joining cells text and variables)

To combine variables with text use the concatenation operator, ampersand (&)

- In the code window type in the following

```
Sub join()
Dim Amount As Integer
Amount = InputBox("enter a value")
MsgBox "The Amount is:" & "£" & amount
End Sub
```

- The code above takes the value you enter in an input box, then displays that as The amount is £90 that is on the assumption you have typed 90 into the input box.

- In the code window type in the following

```
Sub usingfunctions()
    Dim saleseast As Integer, saleswest As Integer, sum As
    Integer
    MsgBox "please enter whole numbers only"
    saleseast = InputBox("enter the total sales for the east")
    saleswest = InputBox("enter the total sales for the west")
    sum = saleseast + saleswest
    Cells(2, 4).Value = sum
    MsgBox "total sales for east and West: £" & sum
End Sub
```

- The above code displays a message box showing a total having adding two variables together.

Exercise 28

Object variables

☞ In the code window type the code below

```
Sub changewkstabcolour()
        Dim wks As Worksheet
        Set wks = ThisWorkbook.Worksheets("sales2011")
        wks.Tab.Color = vbRed
        Set wks = ThisWorkbook.Worksheets("sales2012")
        wks.Tab.Color = vbGreen
End Sub
```

The code above sets variable WKS as a worksheet object, worksheets are a member of the workbook family, and inside the parentheses we define the worksheet name. The property of the tab is changed by referencing the object variable and setting the property to the appropriate colour.

```
Sub changetabsales ()
   ThisWorkbook.Worksheets ("sales").Tab.Color = vbBlue
   ThisWorkbook.Worksheets ("sales2011").Tab.Color = vbGreen
   ThisWorkbook.Worksheets ("sales2012").Tab.Color = vbRed
End Sub
```

In the code above we use this workbook.worksheets to change directly the tab color

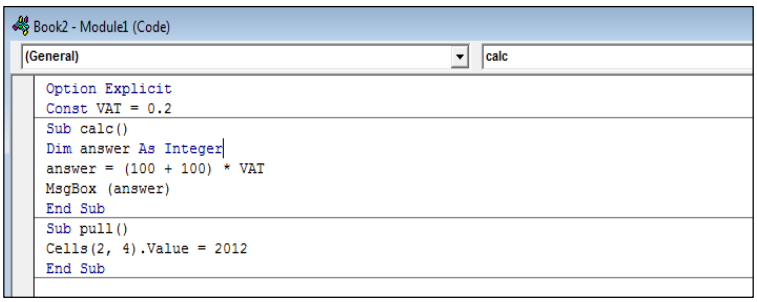
```
Sub changecol ()
   Sheets (ActiveSheet.Name).Select
   ActiveWorkbook.Sheets (ActiveSheet.Name).Tab.ColorIndex = 21
End sub
```

The code above changes the tab colour of the active sheet

Exercise 29 Explanation

Declarations section

The top of the code window includes a declaration section; variables placed here can be used by all procedures within the module remember option explicit is also set in this area.



Scope of variables

Three types of scope are available in VBA as already stated the scope of a variable is determined by the way you declare it.

Procedure-level, when you declare a variable within a procedure it is not accessible outside of the procedure. A procedure level variable is only available within the procedure it is written.

Private module-Level, when declaring a variable in the declaration section of a module using Dim or Private keyword the variable is known as a private module-level variable, the variable can be used by any procedure within the module but cannot be accessed by a procedure outside the module.

Public Module Level, when a variable is declared in the declaration section with the prefix keyword public, the variable is called a public module-level variable these variables can be called from any procedure or module

Scope of procedures

You may have a procedure that performs a general function like multiplying the value of two numbers; this procedure can be included in different modules by giving it the relevant scope. You can also specify a type for the procedure it can be one of the following, Sub, function or property function procedure is similar to a sub function but whereas the sub procedure executes code the function procedure returns a value.

Exercise 29

Calling a sub procedure

- In the code window set up a public function that takes information from Cell D5 and multiply it by .08

```
Option explicit
Public Function CalculateSalesTax() As Currency
  'CalculateSalesTax = Cells(5th row, 4th column)=D5.Value * 0.08
  CalculateSalesTax = Cells(5, 4).Value * 0.08
End Function
```

- In the code window set up the code below this calls the function calculatesalestax

```
Public Sub CallFunc()
      Dim ST As Currency
    'Set st as a currency variable
        ST = CalculateSalesTax()
    'st is the results of a public function calculate sales tax
     Cells(5, 5).Value = Cells(5, 4).Value + ST
     'cell E5 value = D5 value + ST

End Sub
```

Exercise 30

Function procedure

- Similar to sub procedures in the way that are written but a function returns a value. The value that the function produces is stored in a predefined variable. The scope of the function will be either private or public.
- Select Cell

- In excel there is no function called mpg below we have created that function, inside the brackets we have created three variables , line 2 of the code indicates the way the mpg function uses those variables. Remember the rules of BODMAS still apply.
- Type the following code to create a User Defined function MPG

```
Function mpg (start_miles, End_miles, Fuel) As Integer
        mpg = (End_miles - start_miles) / Fuel
End Function
```

Syntax Components

- Function and End function specify the start and finish of the function procedure
- **Function <procedure Name>,** this gives the function its name, the name has to be unique and cannot be a VBA keyword.
- As **<data type>.** Though optional if not declared the variables are set to variant remember we said earlier code is more efficient when specified.
- **<Procedure Body>** the lines of code within the function that make up the function and that are executed in sequential steps.

Exercise 31

Calling function procedures

Below we have a function called sales, this function is called from a subroutine called main. The key word call is used to run the function sales

Call a function From Code

```
Option Explicit
Public Gtotal As Currency
```

```
Public Function sales () As Currency
Gtotal = Cells (8, 2).Value + Cells (8, 3).Value
    Cells (8, 5).Value = gtotal
End Function
```

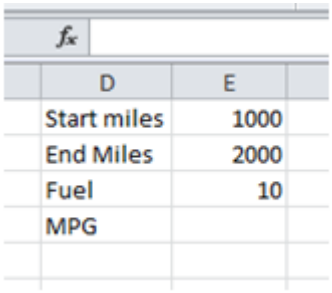
```
PublicSub main ()
    Call sales
End Sub
```

- Select Cell

Exercise 32

Calling a user defined function

- On a clean spreadsheet layout the page as shown below



	D	E
	Start miles	1000
	End Miles	2000
	Fuel	10
	MPG	

- Click into cell C4
- We are going to use our MPG function we created earlier, click of the button in the formula bar
- From the dialogue box from the or select category select user defined, and select the mpg function.
- Complete the mpg dialogue box as required
- Click ok to see the final result

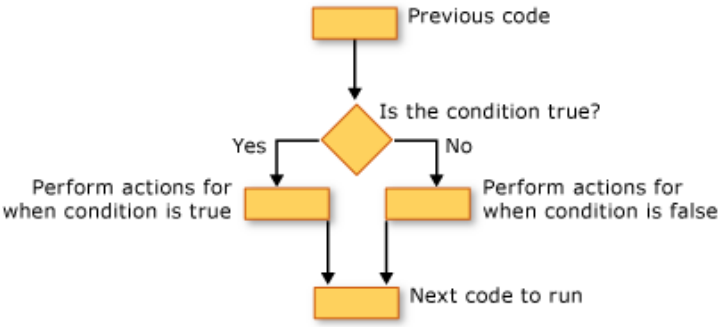
This has now given you an insight to the program basics, we shall now move on to Control and decision structures

Control Structures

Exercise 33

Control Structures

- Overview



Exercise 34

If..then...else construction

Getting to Grips with Logic

If...Then...Else constructions allow you to test for one or more conditions and run one or more statements depending on each condition. You can test conditions and take actions in the following ways:

- Run one or more statements if a condition is **True**
- Run one or more statements if a condition is **False**
- Run some statements if a condition is **True** and others if it is **False**
- Test an additional condition if a prior condition is **False**

The control structure that offers all these possibilities is the If...Then...Else Statement in (VBA). You can use a single-line version if you have just one test and one statement to run. If you have a more complex set of conditions and actions, you can use the multiple-line version.

If..then...else construction cont...

```
Sub test ()
    If condition Then
    [statements]
    ElseIf elseifcondition Then
      [ elseifstatements ]
     Else
      [ else statements ] ]
    End If
End sub
```

Alternative Known as in line

```
    Sub test ()

     If condition Then [ statements ] [ Else [ else statements ] ]

End Sub
```

Syntax property Terminology

Condition
Required. Expression. Must evaluate to True or False, or to a data type that is implicitly convertible to Boolean.
Then
Required in the single-line form, optional in the multiple-line form.
Statements
Optional. One or more statements following If...Then that are executed if condition evaluates to True.
Elseif condition
Required if ElseIf is present. Expression. Must evaluate to True or False, or to a data type that is implicitly convertible to Boolean.
Elseif statements
Optional. One or more statements following ElseIf...Then that are executed if elseifcondition evaluates to True.
Else statements
Optional. One or more statements that are executed if no previous condition or elseifcondition expression evaluates to True.
End If
Terminates the If...Then...Else block.

Exercise 35

In this procedure we check cell reference A1 to check to see if the vale is Less than 100 if the cell evaluates less than 100 the function is deemed as true and places the message Low otherwise no action taken

If then statement

☞ In to a new module type the code below

Using the cells reference row, column

```
Sub testa()
If Cells(1, 1).Value < 100 Then
MsgBox "low"
End If
End Sub
```

Alternative Code

```
Sub testb()
If Cells(1, 1).Value < 100 Then
Cells(1, 2).Value = "poor"
End If
End Sub
```

Using the cell reference letter ,number

Alternative Code

```
Sub testc()
If [a1] < 100 Then
MsgBox "low"
End If
End Sub
```

Alternative Code

```
Sub testd()
If [a1] < 100 Then
[a2]=”poor”
End If
End Sub
```

Exercise 36

In this procedure we check cell reference E4 to check to see if the vale is greater than 100 if the cell evaluates greater than 100 the function is deemed as true and places the message “very high mpg” in cell E4 at the end if it breaks out and continues to run the remainder of the procedure, in this case places "Very Low MPG" value in cell f4

If then else statement

- Type the code below into the code window

Using the cells reference row, column

```
Sub teste()
If Cells(4, 5).Value > 100 Then
Cells(4, 6).Value = "Very high MPG"
Else
Cells(4, 6).Value = "Very Low MPG"
End If
End Sub
```

Alternative Code

Using the cell reference letter ,number

```
Sub testf()
If [e4] > 100 Then
[f4] = "Very high MPG"
Else
[f4] = "Very Low MPG"
End If
End Sub
```

Exercise 37

If then elseif else statement

With the previous examples this has the same effect as using an if statement in a formula in the spreadsheet, in the next example we look at what we consider to be a nested if, using the

Using the cells reference row, column

```
Sub testg()
    If Cells(4, 5).Value <= 10 Then
        MsgBox "change car"
    ElseIf Cells(4, 5).Value <= 40 Then
        MsgBox "Expensive to run"
    ElseIf Cells(4, 5).Value <= 80 Then
        MsgBox "average mpg achieved"
    ElseIf Cells(4, 5).Value <= 90 Then
        MsgBox " above average mpg your now saving"
    Else
        MsgBox "well done you have gone Electric"
      End If
End Sub
```

Alternative Code A

Using the cell reference letter ,number

```
Sub testh()
    If [E4] <= 10 Then
        MsgBox "change car"
    ElseIf [E4] <= 40 Then
        MsgBox "Expensive to run"
    ElseIf [E4] <= 80 Then
        MsgBox "average mpg achieved"
    ElseIf [E4] <= 90 Then
        MsgBox " above average mpg your now saving"
    Else
        MsgBox "well done you have gone Electric"
      End If
End Sub
```

Alternative Code B

Using the cells reference row, column

```
Sub testi()
   If Cells(4, 5).Value <= 10 Then
      Cells(4, 6).Value = "change car"
   ElseIf Cells(4, 5).Value <= 40 Then
      Cells(4, 6).Value = "Expensive to run"
   ElseIf Cells(4, 5).Value <= 80 Then
      Cells(4, 6).Value = "average mpg achieved"
   ElseIf Cells(4, 5).Value <= 90 Then
       Cells(4, 6).Value = " above average mpg your now saving"
Else
      Cells(4, 6).Value = "well done you have gone Electric"
     End If
End Sub
```

Alternative Code c

Using the cell reference letter ,number

```
Sub testj()
        If [E4] <= 10 Then
              [f4]="change car"
        ElseIf [E4] <= 40 Then
              [f4]= "Expensive to run"
        ElseIf [E4] <= 80 Then
        [f4]="average mpg achieved"
        ElseIf [E4] <= 90 Then
             [f4]=" above average mpg your now saving"
        Else
              [f4]= "well done you have gone Electric"
          End If
End Sub
```

Exercise 38 A

Select case statement

- Type is the text below

```
Sub case1()
    x = [A1]
    Select Case x
    Case Is <= 100
    y = "Small"
    Case 101 To 250
    y = "medium"
    Case Else
    y = "large"
    End Select
    [a2] = y
End Sub
```

Exercise 38 B

Select case statement

☞ Type is the text below

```
Sub Using_Case()

    ' Dimension the variable.
    Dim x As Integer
    'Cell A1 populates the variable X
    x = [A1]

    ' Start the Select Case structure.
    Select Case x

      ' Test to see if x less than or equal to 10.
      Case Is <= 10
        ' Display a message box.
        MsgBox "X is <=10"

      ' Test to see if x less than or equal to 40 and greater than 10.
      Case 11 To 40
        MsgBox "X is <=40 and > 10"

      ' Test to see if x less than or equal to 70 and greater than 40.
      Case 41 To 70
        MsgBox "X is <=70 and > 40"

      ' Test to see if x less than or equal to 100 and greater than 70.
      Case 71 To 100
        MsgBox "X is <= 100 and > 70"

      ' If none of the above tests returned true.
      Case Else
        MsgBox "X does not fall within the range"
    End Select

End Sub
```

Exercise 38 C

```
Sub Using_Case()

    ' Dimension the variable.
    Dim x As Integer
    'Cell A1 populates the variable X
    x = [A1]

    ' Start the Select Case structure.
    Select Case x
    ' Test to see if x less than or equal to 0.
    Case Is <= 0
    MsgBox "X is out of range"

      ' Test to see if x less than or equal to 10.
      Case Is <= 10
        ' Display a message box.
        MsgBox "X is between 1 and 10"

      ' Test to see if x less than or equal to 40 and greater than 10.
      Case Is <= 40
        MsgBox "X is between 11 and 40"

      ' Test to see if x less than or equal to 70 and greater than 40.
      Case Is <= 70
        MsgBox "X is between 41 and 70"

      ' Test to see if x less than or equal to 100 and greater than 70.
      Case Is <= 100
        MsgBox "X is between 71 and 100"

      ' If none of the above tests returned true.
      Case Else
        MsgBox "X does not fall within the range"
    End Select

  End Sub
```

Exercise 38

Two functions that can be used in VBA, Choose and Switch

Choose Selects and returns a value from a list

☞ Type the text below into the code Window

```
Sub main()
x = 1
y = Choose(x, "tom", "dick", "harry")
MsgBox y
End Sub
```

Switch evaluates list of pairs of expressions and values and returns the value associated with the first expression in the list that is true.

In the example below the value returns **"$ Dollar"**

```
Sub maina()
  x = "usa"
  y = Switch(x = "uk", "£ Pound", x = "usa", "$ Dollar", x = "esp", "€ Euro")
  MsgBox y
End Sub
```

You now have a full complement of decision making structures

Looping Structures

Exercise 39

Examine Loop structures

You use loop structures such as for… next and for each …next when you want to run a specific block of text repeatedly. Use one of two loop structures depending on the number of iterations that are required.

Fixed iteration This runs a set of statements for a predetermined number of times. Example **For… next loop**

Indefinite Iteration this runs a set of statement until a defined condition is met.

in the example below the numbers add up 1 +2+3 to give a result of 6 if you substitute **for count 1 to 3** with **for count 1 to 10** the numbers added 1+2+3+4+5+6+7+8+9+10 resulting in the value 55 returned. You could run **for count 6 to 7** this adds 6+7 **for count 6 to 9** this adds 6+7+8+9.

Exercise 40

- Type in the following code the answer should be 6

The for…next loop

```
Sub count()
    Dim count As Integer
    For count = 1 To 3
    'this adds 1+2+3
    Sum = Sum + count
    Next count
    'places answer in a cell
    Cells(2, 2).Value = "the sum of the amount " & Sum
    'you could use this if the value added to a worksheet is not
    visible to the user
    MsgBox ("the sum of the amount  " & Sum)
End Sub
```

Exercise 41

- Type in the following code the answer should be 60

The for…next loop

```
Sub countb()
    Dim count As Integer
    For count = 10 To 14
    'this adds 10+11+12+13+14
    Sum = Sum + count
    Next count
    'places answer in a cell
    Cells(2, 2).Value = "the sum of the amount " & Sum
    'you could use this if the value added to a worksheet is not
    visible to the user
    MsgBox ("the sum of the amount  " & Sum)
End Sub
```

Exercise 42

consider a nested if function and how we can convert it into code.

=IF(A1<500,A1*0,IF(A1<=1000,A1*10%,A1*30%))

The for…next loop

```
Sub count2()
        'set the variable name
        Dim count As Integer
        'instruct how many times to loop
           For count = 1 To 20
           'each time the loop runs it passes the number into count in the cells
        range on the next line
           'the number increases with each loop through 1 to 20
           totalsales = Cells(count, 1).Value

         'checks to see if value less than 500
        If totalsales <= 500 Then
           commisionamnt = totalsales * 0

          'checks to see if value less than 10000
         ElseIf totalsales < 1000 Then
           commisionamnt = totalsales * 0.1
         'Value for any value outside the above ranges
        Else
           commisionamnt = totalsales * 0.3
           End If
        'place the commision in the adjacent cell
          Cells(count, 2).Value = commisionamnt
         'Repeats the process until the count of 20 is reached moving down 1
        line on each loop
        Next count

End Sub
```

Exercise 43

The for… each next loop

- Code attached to a command button (addition)

```
Sub CommandButton1Click()
‘sets I and j as variables
Dim i, j As Integer
'will run for 20 rows
For i = 1 To 20
'will run for 12 columns
For j = 1 To 12
'accepts number position from cells above and preforms the calculation
Cells(i, j).Value = i + j - 1
'instructs the code to loop until criteria is met
Next j
Next i
End Sub
```

- Code attached to a command button(multiplication)

- **The for… each next loop**

```
Sub CommandButton2Click()
        ‘sets I and j as variables
        Dim i, j As Integer
        'will run for 20 rows
        For i = 1 To 20
        'will run for 12 columns
        For j = 1 To 12
'accepts number position from cells above and preforms the calculation
                Cells(i, j).Value = i * j
'instructs the code to loop until criteria is met

        Next j
        Next i
End Sub
```

Exercise 44 A

☞ **Do while loop**

Now we introduce you to Conditional Loops Repetition while a certain condition is satisfied or until a certain condition is satisfied.

☞ Type the code below into the VBA code window this sets x as a variable do while x<40 sets the criteria

Take the value of X and add 7 to it

Display message box until criteria is met

```
Sub doloopwhile()
        x = 10
        Do While x < 40
        x = x + 7
        MsgBox x
        Loop
End Sub
```

☞ Try the code below as an alternative

```
Sub doloopuntil()
x = 10
Do Until x > 40
x = x + 7
MsgBox x
Loop
End Sub
```

Exercise 44 B

Do while loop

- Use the code below each number in a cell will be doubled text will be cleared.

```
Sub ForEachCollectionLoop2()
    For Each cell In Range("A1:G50")
    If IsNumeric(cell) Then
    cell.Value = cell.Value * 2
    Else
    cell.Clear
    End If
    Next
End Sub
```

Exercise 45

- **The for… each next loop**

- Use the code below I want you to write comments to explain what is happening.

```
Sub CommandButton1_Click()
        Dim i, j As Integer
        For i = 1 To 20
        For j = 1 To 12
        Cells(i, j).Value = i * j
        Next j
        Next i
End Sub
```

Exercise 46

Custom Dialog Boxes The Process

User Forms

Display interactive dialogs in the Excel interface by including a User Form in your project.

The programming of User Forms can be time-consuming as every action that the User

Form performs has to be coded, the OK button does not do anything until you write the

code contained in its click event.

You need to be familiar with User Form objects, there is no macro recorder.

Designing the User Form

The general methodology for designing User Forms is as follows:

- Insert a User Form into your Project.
- Create the visual image by adding Controls to the Form.
- Name the Controls and set their static properties.
- Write the code in your General Module to show the User Form.

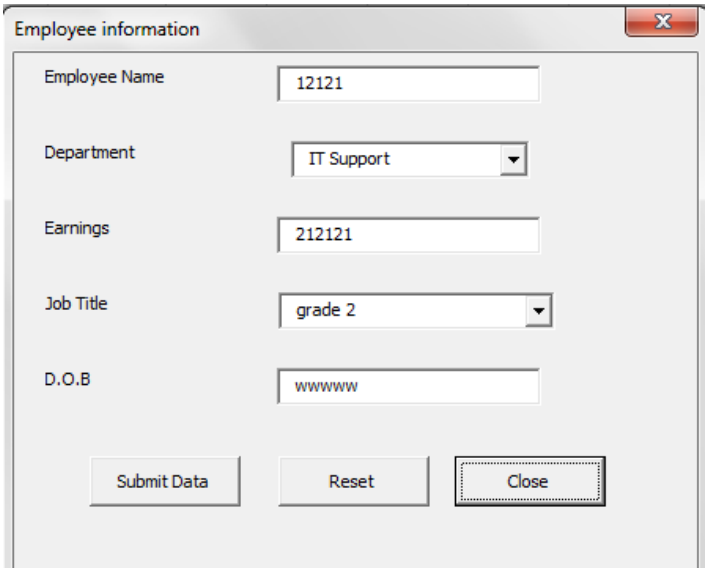
Fill in the event code shells in the User Form's object module.

☞ Setting out naming rules to make code easier to understand.

Check Box	chk
Combo Box	cbo
Command Button	cmd
Frame	Fra
Label	lbl
List Box	Lst
Option Button	opt
Text Box	txt
Toggle Button	Tog
User Form	frm

Exercise 47A

Adding a user form, we are going to take steps to create the form below to accept new data and paste it to the next available row.



- First of all we need to open the user form design interface
- Open a new excel work book
- Save the workbook as my user form 1, as excel macro enabled
- Switch to the VBA Editor
- From the insert menu, select user form
- Make sure the properties form is open F4 or view properties window either way to display your choice.
- Change the (name) property to frmemployeeinfo
- Change the caption to read Employee Information

Exercise 47B

Laying out user Controls (user controls explained) and change property settings

Control	Name	Description
	Label	Displays a text label on a form
	Text Box	Accepts data from users
	CommandButton	Performs actions such as saving data
	ListBox	User can select from a list of values
	CheckBox	Yes or no true or false
	Optionbutton	Represents a single option in a group
	ComboBox	Displays a list of values, the user can select or add to the combo box list.

Adding the Label Employee Name(description)

- Click the Label button and draw a small label
- In the properties window change height to 18
- In the properties window change Width to 78
- In the properties window change Top to 6
- In the properties window change Left to 15
- Change the (name) property to lbl_employeename
- Change the caption to read Employee Name

Adding the Text Box Employee_Name(Data Input Box)

- Click the Text button and draw a small Text Box
- In the properties window change height to 18
- In the properties window change Width to 108
- In the properties window change Top to 6
- In the properties window change Left to 125
- Change the (name) property to TXT_employee_name

Adding the Label Department(description)

- Click the Label button and draw a small label
- In the properties window change height to 18
- In the properties window change Width to 78
- In the properties window change Top to 42
- In the properties window change Left to 15
- Change the (name) property to lblDepartment
- Change the caption to read Department

Adding the Text Box Department(Data Input Box) List Box

- Click the Text button and draw a small List Box
- In the properties window change height to 18
- In the properties window change Width to 108
- In the properties window change Top to 42
- In the properties window change Left to 125
- Change the (name) property to txt_department

We shall populate the list box later!

Adding the Label Earnings(description)

- Click the Label button and draw a small label
- In the properties window change height to 18
- In the properties window change Width to 78
- In the properties window change Top to 78
- In the properties window change Left to 15
- Change the (name) property to lbl_property
- Change the caption to read Earnings

Adding the Text Box Earnings(Data Input Box)

- Click the Text button and draw a small Text Box
- In the properties window change height to 18
- In the properties window change Width to 108
- In the properties window change Top to 78
- In the properties window change Left to 125
- Change the (name) property to txt_earnings

Adding the Label Job Title(description)

- Click the Label button and draw a small label
- In the properties window change height to 18
- In the properties window change Width to 78
- In the properties window change Top to 114
- In the properties window change Left to 15
- Change the (name) property to lbl_job
- Change the caption to read Job Title
- Click the Text button and draw a small label

Adding the Text Box Job_Title(Data Input Box)List Box

- Click the Text button and draw a small List Box
- In the properties window change height to 18
- In the properties window change Width to 108
- In the properties window change Top to 114
- In the properties window change Left to 125
- Change the (name) property to txt_jobtitle

We shall populate the list box later!

Adding the D.O.B Title (description)

- Click the Label button and draw a small label
- In the properties window change height to 18
- In the properties window change Width to 78
- In the properties window change Top to 150
- In the properties window change Left to 15
- Change the (name) property to lbl_dob
- Change the caption to read D.O.B

Adding the Text Box DOB Title(Data Input Box)

- Click the Text button and draw a small Text Box
- In the properties window change height to 18
- In the properties window change Width to 108
- In the properties window change Top to 150
- In the properties window change Left to 125
- Change the (name) property to txt_dob

Adding the Command button(submit Data)

- Click the **button** icon in the tool palate
- Click on the page to place
- In the properties window change caption to Submit

Adding the Command button (Reset)

- Click the **button** icon in the tool palate
- Click on the page to place
- In the properties window change caption to Reset

Adding the Command button (calculate)

- Click the **button** icon in the tool palate
- Click on the page to place
- In the properties window change caption to Calculate

Adding the Command button(Close)

- Click the **button** icon in the tool palate
- Click on the page to place
- In the properties window change caption to Close

The Design of the form is now complete Now let us see what it looks like in real time mode

- Switch to the excel spread sheet
- From the developer button add a command button
- Double click on the command button and add the following code in the VBA editor window

Command buttons to correspond to action required

Show user form

```
Private Sub CommandButton1_Click()
    frmemployeeinfo.Show
End Sub
```

- In the caption section of the properties window for the command button type in the following text. **Show Form**
- **Click** the button to show the form.

Close user form

- Switch back to the form view in the VBA editor
- Double click on the close button add the following code
- Private Sub CommandButton2_Click()
- frmemployeeinfo.Hide
- End Sub

You have added some events to your buttons we shall now explore events even more throughout the following exercises

Understanding Events

VBA is based around event – driven programming. In other words the code doesn't follow a predetermined path, instead it responds to events that a user or condition that occurs. For example the click of a button generates an event, the **on_click** event. Procedures are executed when an event is triggered. User forms and their controls respond to the events that are associated with them. Below is a list of events and their triggers.

User Form Objects	
Event	***Triggers***
Activate	When a user form comes active
Deactivate	When a user form becomes inactive
Click	When a user clicks on any part of a form
DblClick	When a user double clicks any part of a form
Initialize	When a user form is loaded into memory
Terminate	When a user form is unloaded into memory
Control Events	
Event	***Triggers***
Change	A Controls data is changed
Click	A control is clicked
DblClick	A control is double clicked
BeforeUpdate	A controls value is updated through the user form and is about to lose focus. Focus is the ability of a control, user form or window to receive a click or keyboard input
AfterUpdate	A controls value is updated through the user form and loses its focus

Exercise 48

Event handling code

Attach an event handler to a control

- Double click on the command button Submit Data the code window opens as below.

```
Private Sub CommandButton1_Click()
End Sub
```

- Add the following code to read as below this stores the data from the form to the spread sheet in the following Cells A1 ,B1, C1, D1,E1

```
Private Sub CommandButton1_Click()
        Cells(1, 1).Value = frmemployeeinfo.txt_employee_name.Value
        Cells(1, 2).Value = frmemployeeinfo.txt_department.Value
        Cells(1, 3).Value = frmemployeeinfo.txt_earnings.Value
        Cells(1, 4).Value = frmemployeeinfo.txt_job.Value
        Cells(1, 5).Value = frmemployeeinfo.txt_dob.Value
End Sub
```

- Click on the open form button in the main excel spreadsheet add data and submit.

Exercise 49

Adding a combo box for department

- From the form delete the text box txt_department
- Add a combo box
- In the properties window we shall name it txt_department so we do not need to change the code, strictly speaking we should name it cmb_department and change the code to reflect this
- In the Row source type **Z1:Z7**

Adding a combo box for Job Grade

- From the form delete the text box txt_department
- Add a combo box
- In the properties window we shall name it txt_job so we do not need to change the code, strictly speaking we should name it cmb_job and change the code to reflect this
- In the Row source type **y1:y7**
- Close the form and return to excel
- Type the following values in Z1 to z7

  Marketing, HR, IT Support, It Helpdesk, Banking, Sales, Finance
- Type the following values in y1 to y7

  grade 1, grade 2, grade 3, grade 4, grade 5, grade 6, grade 7

Click on show form in the excel window, enter data and click submit, the data should be entered onto the spreadsheet.

Exercise 50

Use the code below to add data to the next line in a spreadsheet

```
Private Sub CommandButton1_Click()
        nextrow = Application.WorksheetFunction.CountA(Range("a:a"))
        Range("a1").Offset(nextrow, 0).Value = txt_employee_name.Value
        Range("a1").Offset(nextrow, 1).Value = txt_department.Value
        Range("a1").Offset(nextrow, 2).Value = txt_earnings.Value
        Range("a1").Offset(nextrow, 3).Value = txt_job.Value
        Range("a1").Offset(nextrow, 4).Value = txt_dob.Value

        frmemployeeinfo.Hide

End Sub
```

Exercise 51

Data validation

If a user accidently enters the wrong data or data is missing we want to be able to set in place some rules of checking that information, this is known as validation. Navigate to the VBA Editor window we are going to set up the following validations.

sets 2 values in the drop down list as soon as you start typing in to employee name. "select from list"

```
Private Sub txt_employee_name_Change()
        txt_department.Value = "select from List"
        txt_job.Value = "select from List"
End Sub
```

Checks to see if there is text in Employee Name if not a message box is displayed , when you click ok on the message box, focus is placed back to the cell to re-enter the data

```
Private Sub txt_employee_name_Exit(ByVal Cancel As
MSForms.ReturnBoolean)
         If IsNumeric(txt_employee_name) = True Then
           MsgBox "text entry only"
           Cancel = True
           End If
End Sub
```

Checks to see if text in "Department" equals "select from list" if yes a message box is displayed "select from list" , when you click ok on the message box, focus is placed back to the cell to re-enter the data

```
Private Sub txt_department_Exit(ByVal Cancel As MSForms.ReturnBoolean)
 If txt_department.Value = "select from List" Then
      MsgBox "Please select item from list"
   Cancel = True
   End If

End Sub
```

Set validation on earnings

```
Private Sub txt_earnings_Exit(ByVal Cancel As MSForms.ReturnBoolean)
        If Val(txt_earnings.Value) <= 0 Then
        MsgBox "Numeric Data Only"
        cancel = True
        End If
End Sub
```

Set validation on job description

```
Private Sub txt_job_Exit(ByVal Cancel As MSForms.ReturnBoolean)
        If txt_job.Value = "select from List" Then
         MsgBox "Please select item from list"
        Cancel = True
        End If
 End Sub
```

Exercise 52

Form check List

Before you unleash your UserForm, give it one final check using the following checklist.

- Are the controls aligned with each other?
- Are similar controls the same size?
- Are controls evenly spaced?
- Is the dialog box too overwhelming? If so, you may want to use a series of dialogs (like a Wizard), or use a Multipage control.
- Can every control be accessed with an accelerator key?
- Are any of the accelerator keys duplicated?
- Are the controls grouped logically (by function)?
- Is the tab order set correctly? The user should be able to tab through the dialog box and access the controls sequentially.
- If the UserForm will be stored in an add-in, did you test it thoroughly after creating the add-in? It's important to remember that an add-in will never be the active workbook.
- Will your VBA code take appropriate action if the UserForm is cancelled, or if the user presses Esc?
- Are there any misspellings in the text? Excel's spelling checker doesn't work with UserForms.
- Does the UserForm have an appropriate caption?
- If applicable, will your UserForm fit on the screen in lower screen resolutions?
- If your UserForm will be used in multiple versions of Excel, have you tested the application on all versions?
- If you use help, is the help topic correct? And does it explain all the controls?

Exercise 53

Debugging and Error Handling

Errors

When you execute a programme, procedure you may get an incorrect result or the execution of the code causes a permanent stop. This can be because a mistake in the code, called a bug or if a statement in the code tries to call an invalid operation.

Examples of this can be a misspelt variable that will cause an error. When an error occurs VBA will either display an error message or refer you to the help file.

VBA provides you with a set of tools for debugging your code these include, toggle or break points, and the watch window.

Error Types

There are three types of programming error, compile time, run time and logical. The following table describes the type of error.

Compile Time error

A compile-time error happens when the program is being compiled. Generally, compile-time errors are syntax errors; and they are caught by the compiler.

Compile Time error This is because no Endif Present

```
Sub calculationbonus()
   Dim bonus As Currency, earnings As Currency
   earnings = InputBox("enter earnings")
   If earnings > 40000 Then
   bonus = earnings * (12 / 100)
   MsgBox "the bonus is " & bonus
End Sub
```

Run Time error

Run-time errors occur at at run-time; generally, the program compiles but does not run correctly. An example of a compile-time error might be leaving out a semi-colon in C. An attempt to read past (dereference) a null pointer in C would be an example of a run-time error.

Run Time Error

This is **a run time error** the code executes and creates a divide by Zero Error because the **(6 / 0)**

```
Sub bonus()
    Dim bonusamt As Currency, salesamt As Currency
    salesamt = 10
    bonusamt = salesamt * (6 / 0)
    MsgBox "bonus is " & bonusamt
End Sub
```

Logical Error

a logic error is a bug in a program that causes it to operate incorrectly, but not to terminate abnormally (or crash). A logic error produces unintended or undesired output or other behaviour, although it may not immediately be recognized as such.

Logic errors occur in both compiled and interpreted languages. Unlike a program with a syntax error, a program with a logic error is a valid program in the language, though it does not behave as intended. The only clue to the existence of logic errors is the production of wrong solutions.

Logical Error

This is a **logical error** the **+** has been used instead of the*****

```
Sub bonus()
    Dim bonusamt As Currency, salesamt As Currency
    salesamt = 10
    bonusamt = salesamt + (6 / 100)
    MsgBox "bonus is " & bonusamt
End Sub
```

Exercise 54

Debugging overview

Debugging

To create an error free application you need to be able to trace an correct errors when they occur, the process is called debugging. VBA provides the following tools to help you debug your code these are located on the debug toolbar.

Debugging tools

The following table describes the tools available to you in VBA to view values of variables and expressions and trace the execution of a program.

Tool	Used To
Break Point	Pause the execution of code at a specified statement. You can insert a breakpoint in the first line of code segment that you suspect to be the cause of the error. You can then monitor the execution of the code
Watch Window	Monitor values of specified variables and expressions while the code is running
Immediate Window	Test your output by assigning different values to variables or expressions
Locals Window	Monitor all the declared variables of the procedure currently running

Exercise 55

Debugging

Break mode and Breakpoint

- Whenever a run time is detected in VBA the execution of the program pauses and the program enters what's called break mode. At this point in time the line of code causing the problem

is displayed and highlighted in yellow, this helps you trace and debug the error. When you're in break mode you can examine also the variables and properties by pointing to them.

- You can set your own breakpoint in the code to pause at a specific place, when the executed code reaches the breakpoint VBA switches into break mode. Breakpoints are temporary markers and are not saved along with the code.
- To insert or remove a breakpoint place the insertion point in the code you want to insert the break point and use one of the following methods.
- Choose debug, toggle breakpoint
- Press F9
- Click the toggle breakpoint button on the debug toolbar (if not open then, view, toolbars, debug.
- Click in the margin indicator bar adjacent to the code click again to remove it.

Setting a Breakpoint

- Open a new work book and layout the data as shown below

- Save as my debugging tools, or open my debugging tools macro enabled workbook

Mouse Training						
Performance Report Excel						
salesperson	**Qtr 1**	**Qtr 2**	**Qtr 3**	**Qtr 4**	**Total Sales**	**Commission**
jackie Whetstone	£2,500.00	£2,750.00	£3,000.00	£3,250.00	£11,500.00	
Glenda Eaton	£3,456.00	£3,121.00	£1,323.00	£4,565.00	£12,465.00	
Lynda hompson	£5,676.00	£6,754.00	£8,765.00	£5,674.00	£26,869.00	
Jane Goodman	£2,345.00	£1,234.00	£5,674.00	£6,754.00	£16,007.00	
Sylvia Myres	£2,500.00	£1,234.00	£2,345.00	£6,754.00	£12,833.00	
Krystyna Ludlow	£6,754.00	£5,674.00	£1,323.00	£6,754.00	£20,505.00	
John Baker	£1,789.00	£2,234.00	£1,789.00	£6,754.00	£12,566.00	
Tony Shaw	£1,314.00	£2,500.00	£1,789.00	£2,234.00	£ 7,837.00	
Andy Lee	£2,234.00	£2,345.00	£1,323.00	£1,234.00	£ 7,136.00	
Mary Smith	£6,754.00	£1,234.00	£2,500.00	£1,323.00	£11,811.00	
Laura Philips	£2,345.00	£1,234.00	£6,754.00	£6,754.00	£17,087.00	
Adam Short	£2,234.00	£6,754.00	£1,789.00	£1,234.00	£12,011.00	
Ken Austin	£1,314.00	£1,234.00	£2,500.00	£2,500.00	£ 7,548.00	
Caroline Watson	£1,789.00	£1,314.00	£2,500.00	£1,323.00	£ 6,926.00	
Shaun Roberts	£2,234.00	£6,787.00	£1,314.00	£2,500.00	£12,835.00	

Type in the following code if you are creating from scratch

```
Sub count2()
'set the variable name
Dim count As Integer
'instruct how many times to loop
   For count = 1 To 15
   'each time the loop runs it passes the number into count in the cells range on the next line
   'the number increases with each loop through 1 to 15
   TotalSales = Cells(count + 1, 6).Value

 'checks to see if value less than 500
If TotalSales <= 5000 Then
   commisionamnt = TotalSales * 0

  'checks to see if value less than 10000
 ElseIf TotalSales < 10000 Then
   commisionamnt = TotalSales * 0.1
 'Value for any value outside the above ranges
Else
   commisionamnt = TotalSales + 0.3
   End If
'place the commision in the adjacent cell
  Cells(count + 1, 7).Value = commisionamnt
 'Repeats the process until the count of 20 is reached moving down 1 line on each loop
Next count

End Sub
```

Click the calculate button the code emulates the formula below

=IF(F2<5000,F2*0%,IF(F2<10000,F2*10%,F2*30%))

However we seem to have a few problems we need to sort out

Click in the column border to set the break point to the left of ElseIf TotalSales < 10000 Then

Press the F5 or play button to run to break point or press f8 to step through the code, make sure you have the locals window open, we can monitor the changes as the code executes.

Use F8 to go straight into step through mode press CTRL+Shift+F8 to escape out of the executing code.

Use shift and F8 to step over code this avoids calling subprocedures

Find the error note the line **commisionamnt = TotalSales + 0.3 it should read commisionamnt = TotalSales * 0.3 multiply not add**

Changing the code makes the logic run correctly and the results are correct logic functions are the hardest to detect

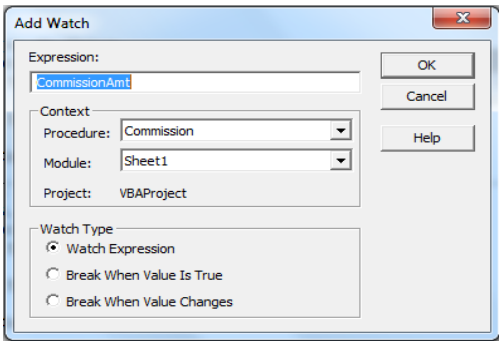
Exercise 56

Watch Expressions

Some errors may not be traceable to a single statement in your code, for example in some logical errors it's difficult to isolate the line of code that is causing the error. In cases such as this you need to monitor the behaviour the expressions and variables of the entire procedure. Each expression or variable you monitor is known as a watch, watch expressions can be defined in either break mode or design time.

How to add a watch expression

- Select debug, click on add watch
- In the expression box to type the variable name
- Under context specify the procedure and module names for the current project, this is important when you have variables of the same name but different scope.
- Click ok to display the watch window
- See example of watch window below



- Consider the following, using the file you have already created make sure you are in the VBE window
- Select debug then add watch
- In the expression box type totalsales, the variable to watch, in the context region make sure the procedure list refers to commision and the module list states sheet1 then set watch type to watch expression
- Click ok
- Repeat the procedure this time add CommissionAmt
- Update the code

Now these watches are in place we shall now use stepping through code to see how they work.

Press the F5 or play button to run to break point or press f8 to step through the code, make sure you have the locals window open, we can monitor the changes as the code executes.

Use F8 to go straight into step through mode press CTRL+Shift+F8 to escape out of the executing code.

Exercise 57

The immediate Window

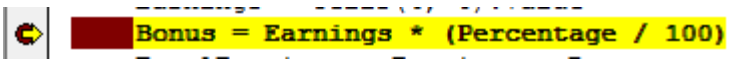
The immediate window helps monitor values assigned to variables and expressions, change the values of variables and expressions and test the results of expressions based on these new values. You can use the print method or use a (?) mark followed by the variable name to view the current value of a variable.

To view , immediate window click the immediate window on the debug window.

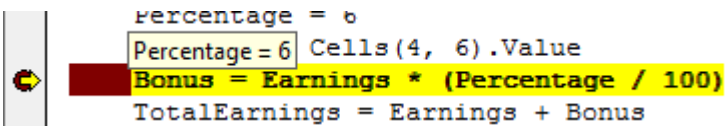
- Copy the following code into the code window pane

```
Option Explicit

    Dim Percentage As Single
    Dim Earnings As Currency, TotalEarnings As Currency, Bonus As Currency
Public Sub NetEarnings()
    Percentage = 6
    Earnings = Cells(4, 6).Value
    Bonus = Earnings * (Percentage / 100)
    TotalEarnings = Earnings + Bonus
    Cells(4, 7) = TotalEarnings
End Sub
```

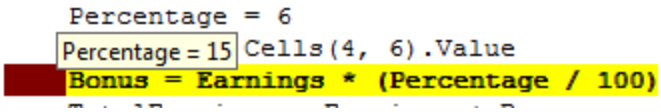
- In the procedure net earnings insert a break point at Bonus = Earnings
- Run the procedure NetEarnings, the code enters break mode



- Point your cursor art the first procedure as shown note the variable percentage as 6



- Click on the debug toolbar to launch the immediate pane
- In the immediate pane type **Percentage = 15, press the enter key**
- Point your cursor art the first procedure as shown note the variable percentage as 15



- Press F8 to run the line that calculates the bonus amount and move to the next line
- In immediate window type Print Bonus to view the bonus amount in the immediate window
- Press the Enter Key to display the bonus amount.
- On the next line of the immediate window type percentage = 20
- Press the Enter Key
- Drag the arrow back to the break point
- Press F8 to run the line that calculates the bonus
- In the immediate window type ?Bonus press the Enter Key
- The bonus is now displayed in the immediate window.
- Remove the Breakpoint
- Close the immediate window
- Update code and run procedure
- Switch back to Excel.
- Save your work

Exercise 58

Locals Window

The locals window helps you monitor the values of variables within the current executing procedure or function

The Locals Window

VBA provides one way to access the objects from which Excel is composed. Start to examine these objects by writing a short routine to change the value of a variable. Activate the VB Editor, select Insert/Module and enter the following subroutine in the code window:

```
Sub SampleVariable()
Dim aval As Variant
    aval = 200
    aval = 123.123
    aval = "Cat"
    aval = True
    aval = #12/1/1998#
End Sub
```

Now select the Locals Window command from the View menu and then use the F8 key to step through the subroutine.

You will see the entries in the Locals Window change as each line is executed with the contents and type of each variable displayed in turn.

Exercise 59

Error handling

The goal of well-designed error handling code is to anticipate potential errors, and correct them at run time or to terminate code execution in a controlled, graceful method. Your goal should be to prevent unhandled errors from arising.

Below we show one example

```
Sub errortest()

'On Error GoTo ErrHandler:
   Worksheets("NewSheet").Activate

   ' the reason for the error is there is no sheet called new sheet
   Exit Sub
'if you un-comment on go to error the following error handler will create a new sheet
ErrHandler:
   If Err.Number = 9 Then
      ' sheet does not exist, so create it
      Worksheets.Add.Name = "NewSheet"
      ' go back to the line of code that caused the problem
      Resume
   End If

End Sub
```

A Note Of Caution

It is tempting to deal with errors by placing an On Error Resume Next statement at the top of the procedure in order to get the code to run without raising an error. This is very bad coding practice. Remember that using On Error Resume Next does not fix errors. It merely ignores them

Code Examples

Used range of cells - worksheet protection by value type

This sub procedure looks at every cell on the active worksheet and if the cell does not have a formula, a date or text and the cell is numeric; it unlocks the cell and makes the font blue.

For everything else, it locks the cell and makes the font black. It then protects the worksheet.
This has the effect of allowing someone to edit the numbers but they cannot change the text, dates or formulas.

```
Sub SetProtection()
   On Error GoTo errorHandler

   Dim myDoc As Worksheet
   Dim cel As Range
   Set myDoc = ActiveSheet
   myDoc.Unprotect
   For Each cel In myDoc.UsedRange
      If Not cel.HasFormula And _
                  Not TypeName(cel.Value) = "Date" And _
                        Application.IsNumber(cel) Then
         cel.Locked = False
         cel.Font.ColorIndex = 5
      Else
         cel.Locked = True
         cel.Font.ColorIndex = xlColorIndexAutomatic
      End If
   Next
   myDoc.Protect
   Exit Sub

errorHandler:
    MsgBox "Error"
End Sub
```

Basic calculation (Sum) in a range of cells

Enters a value into 10 cells in a column and then sums the values (range) using the sum function.

```
Sub SumRange()
   Dim i As Integer
   Dim cel As Range
   Set cel = ActiveCell
   For i = 1 To 10
      cel(i).Value = 100
   Next i
   cel(i).Value = "=SUM(R[-10]C:R[-1]C)"
End Sub
```

Other functions can be used as well as changing the range and values to suit.

Another way to write a formula:

```
Sub CalculateFormula()
   Dim s As String

   ActiveCell.Formula = "=" & _
      ActiveCell.Offset(0, -3).Address(False, False) & "/6"
   s = ActiveCell.Offset(0, -16).Address(False, False) _
      & ":" & ActiveCell.Offset(0, -5).Address(False, False) _
         ActiveCell.Formula = "=SUM(" & s & ")/12"
   ActiveCell.Formula = s
End Sub
```

Nested For...Next with an If statement

This sub checks values in a range of 10 rows by 5 columns moving left to right, top to bottom, switching the values 'X' and 'O'.
Set a range of 10 x 5 cells with a mixture of 'X's and 'O's.

```
Sub ToggleValues()
   Dim rowIndex As Integer
   Dim colIndex As Integer

   For rowIndex = 1 To 10
      For colIndex = 1 To 5
         If Cells(rowIndex, colIndex).Value = "X" Then
            Cells(rowIndex, colIndex).Value = "O"
         Else
            Cells(rowIndex, colIndex).Value = "X"
         End If
      Next colIndex
   Next rowIndex
End Sub
```

Loop through worksheets in a workbook for set ranges

Loops through all worksheets in a workbook and reset values in a specific range(s) on each worksheet to zero where it is not a formula and the cell value is not equal to zero. Change the ranges using a comma separator for each union range.
Modify the condition and its returning value to suit.

```
Sub SetValuesAllSheets()
   Dim wSht As Worksheet
   Dim myRng As Range
   Dim allwShts As Sheets
   Dim cel As Range

   Set allwShts = Worksheets
   For Each wSht In allwShts
      Set myRng = wSht.Range("A1:A5, B6:B10, C1:C5, D4:D10")
      For Each cel In myRng
         If Not cel.HasFormula And cel.Value <> 0 Then
            cel.Value = 0
         End If
      Next cel
   Next wSht
End Sub
```

Worksheet - hidden and visible properties

The distinction between **Hide**(False) and the **xlVeryHidden** constant. Visible = xlVeryHidden - Sheet/Unhide is greyed out. To unhide sheet, you must set the Visible property to True.

Visible = Hide(or False) - Sheet/Unhide is not greyed out
To hide specific (second) worksheet

```
Sub HideSheet()
   Worksheets(2).Visible = Hide  'you can use Hide or False
End Sub
```

To make a specific (second) worksheet very hidden

```
Sub VeryHiddenSheet()
   Worksheets(2).Visible = xlVeryHidden 'menu item is not available
End Sub
```

To unhide a specific worksheet

```
Sub UnHideSheet()
   Worksheets(2).Visible = True
End Sub
```

To toggle between hidden and visible

```
Sub ToggleHiddenVisible()
   Worksheets(2).Visible = Not Worksheets(2).Visible
End Sub
```

Toggle opposite visibility (error will happen as all worksheets cannot be hidden, at least one must be visible in a workbook).

```
Sub ToggleAllSheets()
   On Error Goto errorHandler
   Dim wSh As Worksheet

   For Each wSh In Worksheets
      wSh.Visible = Not wSh.Visible
   Next
   Exit Sub
errorHandler:

End Sub
```

To set the visible property to True on all sheets in a workbook.

```
Sub UnHideAll()
   Dim wSh As Worksheet

   For Each sh In Worksheets
      wSh.Visible = True
   Next
End Sub
```

Inserting worksheets avoiding duplicate names, naming & validations

Checks to see if sheet already exists with the name '*MySheet*' and does not add it again as Excel cannot store duplicate worksheet names in a workbook.

Validation if name already exists or no name stored or if it is a number as its name.

```
Sub AddUniqueSheet()
    Dim ws As Worksheet
    Dim newSheetName As String

    newSheetName = "MySheet" 'Substitute your name here
    For Each ws In Worksheets
        If ws.Name = newSheetName Or newSheetName = "" Or _
                                      IsNumeric(newSheetName) Then
            MsgBox "Sheet '" & newSheetName & "' already exists _
                                    or name is invalid", vbInformation
            Exit Sub
        End If
    Next
    Sheets.Add Type:="Worksheet"
    With ActiveSheet 'Move to last position
        .Move After:=Worksheets(Worksheets.Count)
        .Name = newSheetName
    End With
End Sub
```

Adds new worksheet with the month and year as its name and sets the range("A1:A5") from Sheet1 to new worksheet.

This can only be executed once for the same period due to excel not allowing duplicate worksheets names.

Make sure you have a worksheet called '*Sheet1*' and that its range '*A1:A5*' has some content which to copy across.

```
Sub AddSheet()
    Dim wSht As Worksheet
    Dim shtName As String

    shtName = Format(Now, "mmmm_yyyy") 'current month & year
    For Each wSht In Worksheets
        If wSht.Name = shtName Then
            MsgBox "Sheet already exists...Make necessary corrections _
                                                    and try again."
```

```
            Exit Sub
        End If
    Next wSht
    Sheets.Add.Name = shtName
    Sheets(shtName).Move After:=Sheets(Sheets.Count)
    Sheets("Sheet1").Range("A1:A5").Copy _
                Sheets(shtName).Range("C1") 'range("C1") = starting point
End Sub
```

Copies the contents of the first positioned worksheet to a new worksheet ('*NewSheet*') validating if sheet exists first.

```
Sub CopySheet()
    Dim wSht As Worksheet
    Dim shtName As String

    shtName = "NewSheet" 'change the name if required
    For Each wSht In Worksheets
        If wSht.Name = shtName Then
            MsgBox "Sheet already exists...Make necessary " & _
                                        "corrections and try again."
            Exit Sub
        End If

     Next wSht
          Sheets(1).Copy Before:=Sheets(1)
          Sheets(1).Name = shtName
          Sheets(shtName).Move After:=Sheets(Sheets.Count)
      End Sub
```

Index number for a sheet can be used instead of the actual string name. This is useful if name is not known or you want to control the order position of the sheet in question.

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InputBox and Message Box examples

```
Sub CalcPay()
    On Error GoTo HandleError

    Dim hours
    Dim hourlyPay
    Dim payPerWeek
```

```
    hours = InputBox("Please enter number of hours worked", "Hours Worked")
    hourlyPay = InputBox("Please enter hourly pay", "Pay Rate")
    payPerWeek = CCur(hours * hourlyPay)
    MsgBox "Pay is: " & Format(payPerWeek, "£##,##0.00"), , "Total Pay"
HandleError: 'any error - gracefully end
End Sub
```

No communication with Excel is required for this example and can be started from within the VB Editor.

To split a single line of execution into multiple lines, use the underscore character (_).

What impact will this have if you use the integer function (Int()) instead of the currency functions (CCur)?

Other functions: CDbl (double) and CSng (single).

Date Entry & Formula with **InputBox** which prompts the user for the number of times to iterate, creates heading and calculates gross values with final totals at the end of the columns.

```
Sub ProcessTransactions()
    ActiveCell.Value = "NET"
    ActiveCell.Offset(0, 1).Value =
    "GROSS" ActiveCell.Offset(1, 0).Select

    y = InputBox("How Many transactions?", , 5)
    For counter = 1 To y
        x = InputBox("Enter Net")
        ActiveCell.Value = x
        ActiveCell.NumberFormat = "#,##0.00"
        ActiveCell.Offset(0, 1).FormulaR1C1 = "=RC[-1]*1.175"
        ActiveCell.Offset(0, 1).NumberFormat = "£ 0.00"
        ActiveCell.Offset(1, 0).Select
    Next counter

    ActiveCell.FormulaR1C1 = "=SUM(R[-" & y & "]C:R[-1]C)"
    'Variable y concatenated to formula (Sum)
    ActiveCell.Offset(0, 1).FormulaR1C1 = "=SUM(R[-" & y & "]C:R[-1]C)"
    ActiveCell.Range("A1:B1").Select
    Selection.Font.Bold = True

    With Selection.Borders(xlEdgeTop)
        .LineStyle = xlContinuous
        .Weight = xlThin
        .ColorIndex = xlAutomatic
    End With

    With Selection.Borders(xlEdgeBottom)
```

```
        .LineStyle = xlDouble
        .Weight = xlThick
        .ColorIndex = xlAutomatic
    End With
End Sub
```

The above is A For Next Example with InputBox Function, With Block and Offset method

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Printing examples

To control orientation and defined name range - 1 copy.

```
Sub PrintReport1()
    Sheets(1).PageSetup.Orientation = xlLandscape
    Range("Report").PrintOut Copies:=1
End Sub
```

To print several ranges on the same sheet -1 copy

```
Sub PrintReport2()
    Range("HVIII_3A2").PrintOut
    Range("BVIII_3").PrintOut
    Range("BVIII_4A").PrintOut
    Range("HVIII_4A2").PrintOut
    Range("BVIII_5A").PrintOut
    Range("BVIII_5B2").PrintOut
    Range("HVIII_5A2").PrintOut
    Range("HVIII_5B2").PrintOut
End Sub
```

To print a defined area, centre horizontally, with 2 rows as titles, in portrait orientation and fitted to page wide and tall - 1 copy.

```
Sub PrintReport3()
    With Worksheets("Sheet1")
        .PageSetup
```

```
        .CenterHorizontally = True
        .PrintArea = "$A$3:$F$15"
        .PrintTitleRows = ("$A$1:$A$2")
        .Orientation = xlPortrait
        .FitToPagesWide = 1
        .FitToPagesTall = 1
    End With
    Worksheets("Sheet1").PrintOut
End Sub
```

To print preview, control the font and to pull second line of header ("A1") from first worksheet.

```
Sub PrintHeaderPreview()
    ActiveSheet.PageSetup.CenterHeader = "&""Arial,Bold Italic""&14 _
        My Report" & Chr(13) & Sheets(1).Range("A1")
    ActiveWindow.SelectedSheets.PrintPreview
End Sub
```

"&""Arial,Bold Italic""&14 = fields used in page set-up of header/footer

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General application commands

Using the shortcut approach to assign a cell with an Excel function.

```
Sub GetSum()
    [A1].Value = Application.Sum([E1:E15])
End Sub
```

Can use an absolute reference: Range("A1") = Application.Sum([E1:E15])

Other functions - AVERAGE, MIN, MAX, COUNT, COUNTBLANK, COUNTA, VLOOUKP etc…

Enables the use of events if disabled (worksheet/workbook).

```
Sub EnableEventReset()
    Application.EnableEvents = True
End Sub
```

To display the full path and filename of the current workbook (Function)

```
Sub FormatHeader()
    With ThisWorkbook
        .Worksheets("MySheet").PageSetup.LeftHeader = .FullName
    End With
End Sub
```

Capture object (chart) into as separate file

```
Sub ExportToJPG()
    ActiveChart.Export FileName:="c:\Mychart.jpeg", FilterName:="JPG"
End Sub
```

Make sure chart is selected first
Add a custom button to the 'Chart' quick access toolbar.

Assign and un-assign a function key to a procedure

```
Sub Set_FKeys()
    Application.OnKey "{F3}", "MySub"
End Sub
```

```
Sub Restore_FKeys()
    Application.OnKey "{F3}"
End Sub
```

Can be assigned to the event of when a workbook opens a closes.

Cursors

```
Sub ShowHourGlass()
    Application.Cursor = xlWait
End Sub
```

```
Sub ResetCursor()
    Application.Cursor = xlNormal
End Sub
```

Can also be **xlNorthwestArrow** and **xlIBeam**.

Some more to finish off with...

```
With ActiveWindow
    .DisplayGridlines = Not .DisplayGridlines
    .DisplayHeadings = Not .DisplayHeadings
    .DisplayHorizontalScrollBar = Not .DisplayHorizontalScrollBar
    .DisplayVerticalScrollBar = Not .DisplayVerticalScrollBar
    .DisplayWorkbookTabs = Not .DisplayWorkbookTabs
End With
```

```
With ActiveWindow
    .DisplayFormulaBar = Not .DisplayFormulaBar
    .DisplayStatusBar = Not .DisplayStatusBar
End With
```

```
Selection.Clear 'clears all attributes
Selection.ClearFormats 'clears only formats
Selection.ClearContents 'clears only content (DEL)
```

Active cell moves I row, 1 column in for selection

```
Sub ActiveCellInRange()
    Range("A11:D15").Select
    Selection.Offset(1, 1).Activate
End Sub
```

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Ranges - various examples

To add a range name for known range

```
Sub AddName1()
    ActiveSheet.Names.Add Name:="MyRange1", RefersTo:="=$A$1:$B$10"
End Sub
```

To add a range name based on a selection.

```
Sub AddName2()
    ActiveSheet.Names.Add Name:="MyRange2", RefersTo:="=" & _
                                            Selection.Address()
End Sub
```

To add a range name based on a selection using a variable.

```
Sub AddName3()
    Dim rng As String

    rng = Selection.Address
    ActiveSheet.Names.Add Name:="MyRange3", RefersTo:="=" & rng
End Sub
```

To add a range name based on current selection.

```
Sub AddName4()
    Selection.Name = "MyRange4"
End Sub
```

Deletes all named ranges

```
Sub DeleteAllRanges()
    Dim rName As Name
```

```
    For Each rName In ActiveWorkbook.Names
        rName.Delete
    Next rName
End Sub
```

Scrolls the spreadsheet to where the active cell is.

```
Sub ScreeTopLeft()
    ActiveCell.Select
    With ActiveWindow
        .ScrollColumn = ActiveCell.Column
        .ScrollRow = ActiveCell.Row
    End With
End Sub
```

Function to return a range object.

```
Function LastCell(ws As Worksheet) As Range
    Dim LastRow As Long, LastCol As Long
    'Error-handling is here in case there is not any
    'data in the worksheet
    On Error Resume Next

    With ws
        'Find the last row
        LastRow = .Cells.Find(What:="*", _
             SearchDirection:=xlPrevious, _
             SearchOrder:=xlByRows).Row
        'Find the last column
        LastCol = .Cells.Find(What:="*", _
             SearchDirection:=xlPrevious, _
             SearchOrder:=xlByColumns).Column
    End With
    'Finally, initialize a Range object variable for
    'the last populated row.

    Set LastCell = ws.Cells(LastRow, LastCol)
End Function
```

Call procedure for above (not for a worksheet function call)

```
Sub ShowLastCell()
    MsgBox LastCell(Sheet1).Address(False, False)
End Sub
```

Try MsgBox LastCell(Sheet1).Row

Try MsgBox LastCell(Sheet1).Column

Check to see if active cell is in range A1:A10.

```
Sub CheckRange()
    Dim rng As Range

    Set rng = Application.Intersect(ActiveCell, Range("A1:A10"))
    If rng Is Nothing Then
        MsgBox "It is not in the range.", vbInformation
    Else
        MsgBox "It's in the range called 'A1:A10'!", vbCritical
    End If
End Sub
```

Current selected rows or cells in a column.

```
Sub MyCount()
    Dim myCount As Long
    myCount = Selection.Rows.Count
    MsgBox myCount
End Sub
```

Number of worksheets in a workbook.

```
Sub MySheetCount()
    Dim myCount As Long
    myCount = Application.Sheets.Count
    MsgBox myCount
End Sub
```

Copy and paste a range (A1:A3) to active cell in same worksheet.

```
Sub CopyRange1()
    Range("A1:A3").Copy Destination:=ActiveCell
End Sub
```

Copy and paste a range (A1:A3) to active cell from 'Sheet3'.

```
Sub CopyRange2()
    Sheets("sheet3").Range("A1:A3").Copy Destination:=ActiveCell
End Sub
```

Show current active cell position (address) – co-ordinate

```
Sub MyPosition()
    Dim myRpw, myCol
    myRow = ActiveCell.Row
    myCol = ActiveCell.Column
    MsgBox myRow & "," & myCol
End Sub
```

Specific Range references

`Range("A1")`	Cell A1
`Range("A1:E10")`	Range A1 to E10
`[A1]`	Cell A1
`[A1:E10]`	Range A1 to E10
`ActiveCell.Range("A2")`	The cell below the active cell
`Cell(1)`	Cell A1
`Range(Cells(1,1),Cell(10,5))`	Range A1 to E10
`Range("A:A")`	Column A
`[A:A]`	Column A
`Range("5:5")`	Row 5
`[5:5]`	Row 5
`Sheets("Sheet1")`	Sheet called Sheet1

`Worksheets("Sheet1")`	Worksheets called Sheet1
`Sheets(2)`	Second worksheet in workbook
`Worksheets(3)`	Third worksheet in workbook
`Worksheets("Sheet1").Range("A1")`	Cell A1 in Sheet1
`[Sheet1].[A1]`	Cell A1 in Sheet1
`ActiveSheet.Next`	The sheet after the active sheet
`Workbook("Test")`	Workbook file called Test.xls

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Navigation in a worksheet using Offset

```
Sub MoveDown()
    ActiveCell.Offset(1, 0).Select
End Sub
```

```
Sub MoveUp()
    ActiveCell.Offset(-1, 0).Select
End Sub
```

```
Sub MoveRight()
    ActiveCell.Offset(0, 1).Select
End Sub
```

```
Sub DownLeft()
    ActiveCell.Offset(0, -1).Select
```

```
End Sub
```

```
Sub LastCellInRange()
    Range(ActiveCell.Address).End(xlDown).Select
    Range(ActiveCell.Address).End(xlToRight).Select
End Sub
```

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Read Window documents

Calling sub procedure passing a string argument.

Use the Private keyword, which is local and invisible via Excel application.

```
Private Sub ReadFiles(Path As String)
    Dim FileName As String

    'Initialize a string variable for the first file
    'in a specified directory. This sets the Dir( )
    'function to that directory.

    Select Case Right(Path, 1)
        Case "\":    FileName = Dir(Path)
        Case Else:   FileName = Dir(Path & "\")
    End Select

    'Loop through the specified directory until the
    'Dir( ) function returns an empty string, indicating
    'there are not any more contents to be evaluated.

    Do While Len(FileName) > 0
        'Print each file name to the immediate (debug) window
        Debug.Print FileName
        'Re-initialize the string variable to the next
        'file in the directory
        FileName = Dir()
    Loop
End Sub
```

Call the above in a separate procedure

```
Sub ListFiles()
    ReadFiles "c:\winnt"
End Sub
```

General function examples

Displays the period quarter.

```
Function Qtr(dtOrig As Date) As String
    Dim qtrNo As Integer
    Dim sQtr As String

    Select Case Format(dtOrig, "q")
        Case Is = 1
            sQtr = "1st Qtr"
        Case Is = 2
            sQtr = "2nd Qtr"
        Case Is = 3
            sQtr = "3rd Qtr"
        Case Is = 4
            sQtr = "4th Qtr"
        Case Else 'assume 1
            sQtr = "1st Qtr"
    End Select
    Qtr = sQtr
End Function
```

In a worksheet, enter the formula: =Qtr("01/01/2010")

Show full path and file name in a worksheet.

```
Function FileName()
    FileName = Application.Caller.Parent.Parent.FullName
End Function
```

In a worksheet, enter the formula: **=FileName()**

Return the difference in percentage terms of two values (increase/decrease).

```
Function PChange(OrigVal As Double, NewVal As Double) As Single
    If OrigVal = 0 Then
        PChange = ""
    Else
        PChange = ((NewVal - OrigVal) / Abs(OrigVal))
    End If
End Function
```

In a worksheet, enter the formula: **=PChange(100,150) = 50%**
(0.5 for unformatted)

Gross Price (inc)

```
Function TotalValue(Qty As Double, UPrice As Double) As Double
    TotalValue = Format((Qty * UPrice * 1.175), "£#,##0.00")
End Function
```

Age (simple)

```
Function Age2(DOB)
    Age2 = Int((Now() - DOB) / 365.25) & " Years old"
End Function
```

Age (alternative)

```
Function Age(DOB)
    If Month(DOB) > Month(Now) Then
        Age = Year(Now) - Year(DOB) - 1
    ElseIf Month(DOB) < Month(Now) Then
        Age = Year(Now) - Year(DOB)
    ElseIf Day(DOB) <= Day(Now) Then
        Age = Year(Now) - Year(DOB)
    Else
        Age = Year(Now) - Year(DOB) - 1
    End If
End Function
```

Returns the cell in range which is underline (single style) or the word “unknown”

```
Public Function GetUnderlinedCell(CellRef As Range) As String
    Dim c As Integer
    Dim sResult As String

    'Force Running when Recalculating Since Formatting Only
    Application.Volatile True

    'Assume Unknown
    sResult = "Unknown"

    'Loop Thru Each Column and Test for Underline
    For c = 1 To CellRef.Columns.Count
        If CellRef.Columns(c).Font.Underline = xlUnderlineStyleSingle Then
            sResult = CellRef.Columns(c).Value
        End If
    Next c

    'Return Results
    GetUnderlinedCell = sResult
End Function
```

Visual Basic Functions - **Choose** (Lookup).

```
Sub LookupExample()
    Dim strMonth As String
    Dim bytCurMonth As Byte

    bytCurMonth = Month(Date)
    strMonth = Choose(bytCurMonth, "Jan", "Feb", "Mar", "Apr", _
                  "May", "Jun", "Jul", "Aug", "Sep", "Oct", "Nov", "Dec")
    MsgBox "Current month is " & strMonth
End Sub
```

Also, take a look at the **`Switch()`** function using VBA Help.

Creates a new word document

Creates a new word document and populates the contents of cell "*B1*" along with some basic formatting.

You need create a reference to the Word Object Library (8.0/9.0/10.0/11.0) in the VB Editor

```
Sub CreateMSWordDoc()
    On Error GoTo errorHandler

    Dim wdApp As Word.Application
    Dim myDoc As Word.Document
    Dim mywdRange As Word.Range

    Set wdApp = New Word.Application

    With wdApp
        .Visible = True
        .WindowState = wdWindowStateMaximize
    End With

    Set myDoc = wdApp.Documents.Add
    Set mywdRange = myDoc.Words(1) 'index range?

    With mywdRange
        .Text = Range("B1") & vbNewLine & "This above text is _
                                              stored in cell 'B1'."
        .Font.Name = "Comic Sans MS"
        .Font.Size = 12
        .Font.ColorIndex = wdGreen
        .Bold = True
    End With
```

```
errorHandler:
    Set wdApp = Nothing
    Set myDoc = Nothing
    Set mywdRange = Nothing
End Sub
```